INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS

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**VIA EMAIL**

Dr. Geraldine Richmond
Undersecretary of Science and Energy
U.S. Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

Ms. Carla Frisch
Acting Executive Director and Principal Deputy Director
Office of Policy
U.S. Department of Energy
1000 Independence Avenue SW
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**Re: IBEW Comments on Docket No. DOE-HQ-2021-0020, Request for Information on Energy Sector Supply Chain Review**

Dear Undersecretary Richmond and Acting Executive Director and Principal Deputy Director Frisch:

The International Brotherhood of Electrical Workers (IBEW) submits these comments in response to U.S. Department of Energy ("Department" or "DOE") Docket No. 2021-0020, Request for Information on Energy Sector Supply Chain Review.[1] These comments are submitted in response to the Department's request for data and information on understanding the supply chains of energy and energy systems and technologies. In addition, we outline policies that we believe will further the Administration's goal of creating a "world-class American manufacturing base and workforce."[2]

The IBEW is a labor organization representing approximately 775,000 active members. IBEW members have historically served a significant role in the manufacturing of America's energy supply chain, as the largest labor union in the energy and electricity manufacturing sector, including power transformers, nuclear energy components, semiconductors, and transmission cable. Manufacturing was previously the largest source of employment for IBEW's membership, numbering approximately 400,000 in the manufacturing sector in the 1980's, before much of this work was offshored to foreign markets. Today, less than 30,000 IBEW members are employed in manufacturing.

The IBEW's comments will focus primarily on responding to Topic Area 5: Electrical Grid – Transformers and HVDC. Our organization represents workers who design and build high voltage transformers used throughout the U.S. electric

[1] Request for Information on Energy Sector Supply Chain Review, Notice, U.S. Department of Energy Docket No. 2021-25898, 86 FR 67695 (November 29, 2021).

[2] Executive Order on America's Supply Chains (February 24, 2021), https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains/.

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grid. These workers produce both large power transformers and medium power transformers, which operate from 230 kilovolt (kV) down to 69kV. Focusing only on large power transformers, while seemingly consistent with the request for information on high-voltage direct current technology, would only exacerbate the overall grave shortage of transmission level transformers and create a choke-point for expansion of the grid to accept all clean energy resources necessary to decarbonize the electricity sector. Without including medium power transformers in this topic area, the grid would be vulnerable to failure at a different level. Such a critical oversight would leave electricity consumers with the same result – repeated power outages throughout the country causing significant harm to regional public safety, health, and economic systems.

Domestic manufacturers of all transmission scale transformers face dangerous systematic challenges, both for large power transformers (LPTs) and medium power transformers (MPTs). Unfortunately, the flood of foreign transformers and components in the U.S. market has the domestic transformer industry teetering on the brink of collapse. As the transformer manufacturing industry has noted, there is:

> "Limited, to non-existence, incentive for domestic sourcing of power transformers and other critical grid components from domestic companies by the utilities. Unlike other nations, there is simply no national priority in supporting American manufacturers of power transformers. This has led to a disincentive for domestic power transformer manufacturers to expand domestically and/or source domestic components, which ultimately has led to the increases in supply chain costs to manufacture quality transformers, further putting the domestic transformer manufacturing industry at a disadvantage compared to foreign competition."[3]

The decades-long failure to nurture the domestic marketplace has allowed extensive dumping of transformers and transformer components from other countries into the United States market. Even when the federal government has intervened, these actions have been ineffective and, in a few instances, have even made American transformer manufacturers less competitive with their foreign competitors.

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[3] Public Comments of the Domestic Transformer Manufacturers Coalition dated June 7, 2021, responding to the Department's Request for Information (RFI) on Ensuring the Continued Security of the United States Critical Electric Infrastructure, Docket No. 2021-08482, 86 FR 21309, (issued April 22, 2021), https://www.energy.gov/sites/default/files/2021-06/Steve%20Newman%20Delta%20Star-A1.pdf. *See also* U.S. Department of Energy, *Large Power Transformers and the U.S. Electric Grid* (April 2014), https://www.energy.gov/sites/prod/files/2014/04/f15/LPTStudyUpdate-040914.pdf.

As a result, roughly 75 percent of the market for LPTs and MPTs comes from competitors overseas, resulting in a critical domestic transformer industry vulnerability. There are just over a dozen transformer manufacturers in the United States today. Of those, only a handful produce LPTs. The remainder produce MPTs. The majority of LPTs used in the U.S. are imported and about half of the MPTs are imported. Most transformers are produced overseas, primarily in China, although some come from Europe. These weaknesses in the transformer manufacture supply chain, coupled with the fact that a majority of all transformers in service today are over 50 years old, threaten grid reliability throughout the country. Although these aging transformers must be replaced, there is no existing plan or program to do so.

Another crucial supply chain vulnerability is the lack of a domestic source for raw materials and parts necessary for manufacturing transformers domestically, leading to higher costs and sourcing challenges. Consequently, the two main raw materials – copper and electrical steel, specifically grain oriented electrical steel – must be imported, along with other critical components. This represents roughly 55 to 65 percent of the cost of the LPTs sold domestically. To secure adequate supplies and components and ensure robust production of high-voltage power transformers in the U.S., the federal government must fully rebuild the domestic supply chain.

The national security implications of reliance on an international supply chain for LPTs, MPTs, and mobile substations are substantial, and the Administration has already recognized this fact.[4] Countries with track records of malicious cyber activity have almost unlimited opportunity and access to our critical grid infrastructure via the nearly 2,000 transformers imported annually. Immediate steps should be taken to ensure that power transformers and their parts are manufactured in the U.S. Lastly, countries with track records of malicious activity should be indefinitely prohibited from providing such sensitive components needed to maintain and operate the electric grid.

We respectfully request that the Department include consideration of the supply chain required for the development and manufacture of "mobile substations" as part of this RFI. Manufacture of mobile substations requires a supply chain similar to that of high-voltage transformers. A mobile substation can be used on a temporary basis anywhere in the country and would be particularly effective for use on military bases, to ensure military readiness in the event of enemy cyber-attack, as well as remote civilian areas or subject to extreme weather. These are locations

[4] White House Fact Sheet: Biden Administration Announces Further Actions to Protect U.S. Critical Infrastructure (January 24, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/07/28/fact-sheet-biden-administration-announces-further-actions-to-protect-u-s-critical-infrastructure.

where it is difficult to maintain adequate transformer reserves and locations in which transformers are routinely under severe stress. A mobile substation can be rolled in to replace a transformer in case of failure and can operate effectively to relieve other elements of the grid under stress, thereby reducing the likelihood of further equipment failures. Mobile substations can address many of the emergency reliability issues that threaten the reliable operation of today's electric grid.

Outsourcing the manufacture of high-voltage transformers presents serious threats to grid reliability as well as national security. The high number of aging infrastructure increases the risk that significant portions of the U.S. electric grid could crash due to transformer failure. The federal government must develop a "grid resilience strategy" in order to harden the grid, protect against increasingly extreme weather, protect against cyber and other attacks by our enemies and reduce adverse impacts to vulnerable populations, including African-American, Indigenous, Latino, and other people of color, as well as rural communities.

Fundamental to such a strategy is establishing "transformer security" by rebuilding the domestic supply chain for LCP and MPT manufacturing and confirming the viability and security of each transformer currently serving the grid. To ensure success, the IBEW recommends that the Department:

- Work in close coordination with the domestic transformer manufacturing industry;
- Develop clear oversight with utilities, independent system operators, and transmission line owners, led by DOE and the Federal Energy Regulatory Commission (FERC), to inventory, inspect, test, remediate, and certify existing high-voltage (transmission) transformers;
- Expand the Department's oversight to include all transformer critical components and industrial control systems that are exposed to cyber-attacks or manufacturing sabotage and could result in damage or destruction of equipment and power outages at critical times.

Without the ability to produce the high-voltage transformers to meet our current needs, the United States is at risk. Failure to address this shortcoming will push this essential industry over the edge. Taking the recommended steps is the only reasonable path to re-establishing sufficient domestic supply of LPTs, MPTs, and mobile substations that are reliable, resilient and safe from cyber threats. This will ensure that the national electric grid can grow and adapt to evolving security challenges and accommodate new supplies of bulk clean energy that will be required to meet the Administration's emissions reduction targets.

The federal government cannot continue to overlook the past recommendations to act on ensuring a secure domestic manufacturing base and supply chain for LPT, MPT and mobile substations. To promote grid reliability and maintain national security, various entities, and experts (including the Department) have advised Congress and the Executive Branch to create a transformer reserve. It is imperative that the federal government establish a U.S. strategic transformer reserve as soon as feasible, to ensure access to LPTs, MPTs and mobile substations whenever and wherever they are needed. Furthermore, the federal government should follow the clear recommendations and recognize the inherent strategic weakness of our current grid security system.[5] In addition, a new strategy is needed to make new transformers more uniform and parts more easily accessible for efficient replacement and repair to ensure grid reliability over the operation and maintenance of many different utilities.[6] Recognizing this weakness, the 2020 report of the House Select Committee on the Climate Crisis found that we are on the edge of grid resilience failure and identified the need for a strategic transformer reserve as a core component of the federal government's response to climate change.[7] In short, the federal government must follow the advice of experts, industry leaders and its own agencies and establish a Strategic Transformer Reserve. This reserve should include LPTs, MPTs and mobile substations.

The federal government, and the Department in particular, needs to address three main questions to effectively mitigate the current threat to the safety and reliability of the U.S. electrical grid. First, the U.S. imports most of its high-voltage, transmission scale transformers, many coming from countries which pose a security risk. Second, most of the high-voltage transformers in service today are at least 50 years old and are approaching or have exceeded their operational life expectancy. Third, and worst of all, we have no supply of back-up transformers should the existing ones fail or are compromised by a cyber-attack.

The good news is that the existing vulnerability to our electrical grid can be overcome expeditiously with a concerted plan to rebuild the domestic manufacturing of LPTs, MPTs and mobile substations, including, for example:

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[5] Rebecca Smith, *U.S. Risks National Blackout From Small-Scale Attack*, Wall Street Journal (Mar. 12, 2014), https://www.wsj.com/articles/u-s-risks-national-blackout-from-small-scale-attack-1394664965.

[6] Electric Power Research Institute for the U.S. Department of Homeland Security Science and Technology Directorate, *Considerations for a Power Transformer Emergency Spare Strategy for the Electric Utility Industry* (Sept. 30, 2014), https://www.dhs.gov/sites/default/files/publications/RecX%20-%20Emergency%20Spare%20Transformer%20Strategy-508.pdf.

[7] House Select Committee on the Climate Crisis, Solving the Climate Crisis (June 2020), https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf.

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- Creating incentives for utilities, power companies and suppliers to manufacture this critical equipment domestically;
- Adding conditions to federal government assistance that encourages employers to create high-road jobs in this sector that are open to cooperating with labor unions;
- Mandating adequate training be provided to perform this work safely and efficiently; and
- Establishing a strategic transformer reserve to stockpile this critical equipment throughout the United States and require the equipment held in the strategic transformer reserve to be domestically manufactured to assure grid reliability and military readiness.

Adoption of these recommendations will significantly enhance grid safety and reliability, which needs to be considered a top priority for the Department and the federal government. The IBEW and its 775,000 members are ready to work with the current Administration and the U.S. Department of Energy to build our domestic transformer manufacturing capacity and supply chain and ensure the electrical grid can continue to be relied on to build the electrified, low carbon economy that the 21st century economy requires.

Sincerely yours,

Lonnie R. Stephenson

Lonnie R. Stephenson
International President

LRS:jrl